

## GRP ladder and tray

### Material

GRP (Glass Reinforced Polyester) has, good stability to UV, great mechanical strength and is 40% lighter than steel. GRP is a non-conductive insulating material, resistant to temperatures from -800C to + 1400C and has excellent resistance to fire and corrosion being self-extinguishing and zero halogen.

### Installation

#### Expansion/contraction

Bases come with

#### Fitting

- Secure base at centres of 1500mm apart.
- Supports should be position at a maximum of 300mm from the start or finish of a run.
- Place the projecting lip of the next base into previous base, maintaining joint for expansion.

### Bend radius control

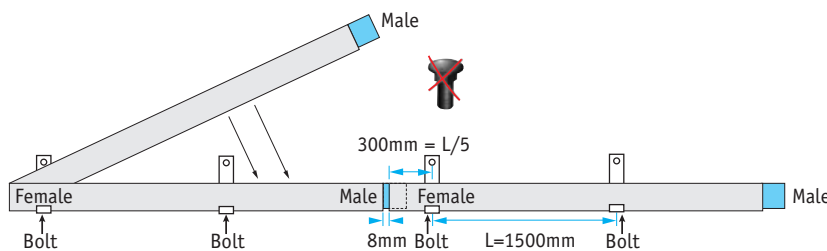
Hot press moulded technique of manufacture permits the forming of 3000mm base/covers and a large range of fittings with various bend radius controls.

### Covers

Covers should overlap the base joint by at least 300mm to ensure maximum strength. Secure to the base by four clips, two required at 50-100mm from each end.

### Loading characteristics

- Deflection <5mm (1/300).
- Coefficient of safety >1.7 (in accordance with IEC 61537) using the interlocking and self-adjustable coupling without fasteners.
- Loading diagram details (below) in accordance with IEC 61537, at an ambient temperature of 250C.



### Positioning couplings without screwing junctions

- Every junction fitting should have accompanying support within 200mm.
- All bases and fittings must be fixed laterally with 4mm clearance holes on each side of support.
- Built-in, self-adjusting, interlocking couplers automatically provide an expansion joint for thermal movement.
- Can be drilled with standard power tools.
- When cutting by hand, a tungsten, carbide-tipped, heavy duty cross-cut saw is recommended.
- Power disc cutting equipment makes this task easier but should be done in an open air environment.

**GRP ladder and tray - continued**

**GRP cable ladders pultruded**

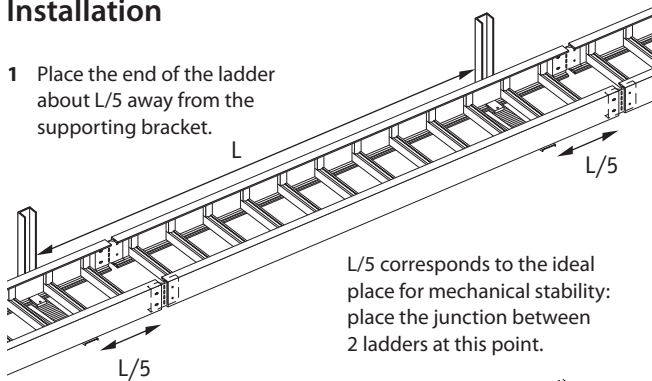
**Resin types (all zero halogen)**

Polyester (standard)	good all round performance, mechanical strength, corrosion resistance, fire behaviour, temperature rating
Acrylic (on request)	excellent resistance to fire in a corrosive environment
Vymilester (on request)	highly resistant to a specific range of chemical agents (H2SO4HC1...)
Carbon loaded polyester (on request)	antistatic properties for highly explosive atmospheres

Alternatively for specific projects we will define a solution to meet your needs.

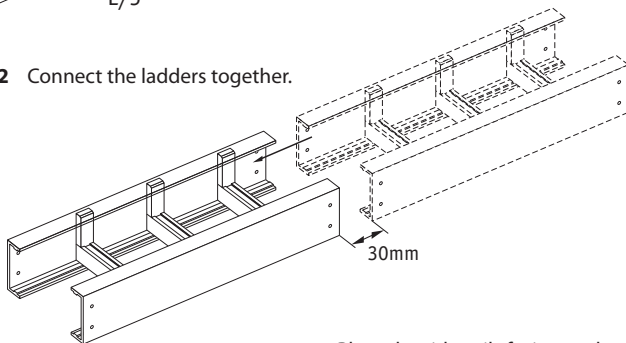
**Installation**

**1** Place the end of the ladder about L/5 away from the supporting bracket.

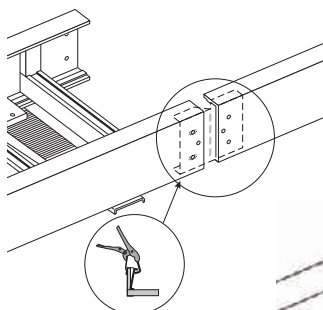


L/5 corresponds to the ideal place for mechanical stability: place the junction between 2 ladders at this point.

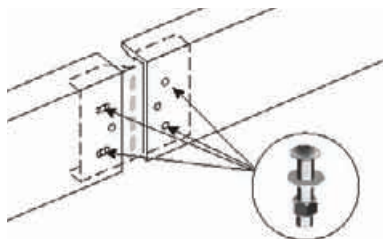
**2** Connect the ladders together.



Place the side-rails facing each other.



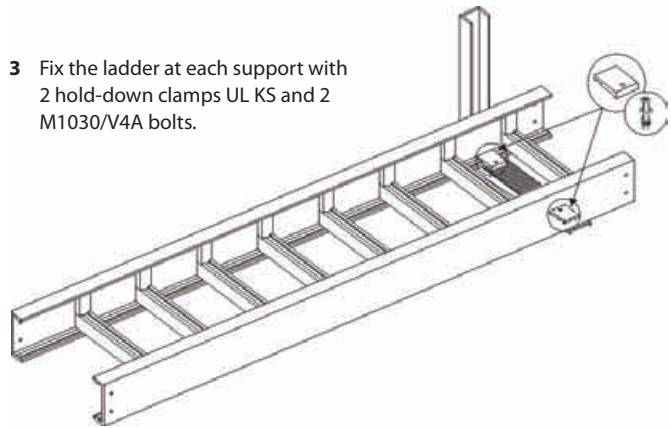
Fix the stainless steel splice plates UL IH with the help of stall clips, the oval holes\* placed nearest the supporting bracket.



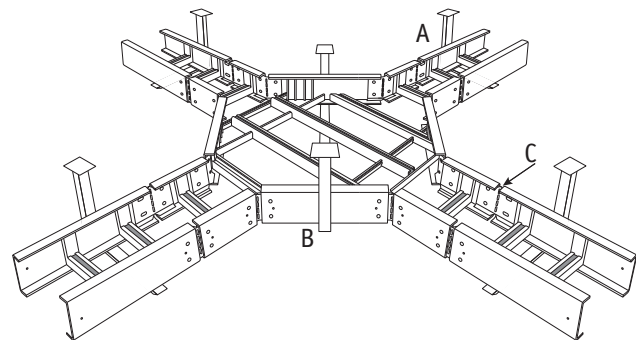
Lock the junction with 4 x M620/V4AS bolts.

(\*) The splice plates UL IH are pre-punched with 2 holes Ø 8mm and 2 oval holes 20 x 8mm in order to assure a solid fixing and to allow the expansion of the GRP material.

**3** Fix the ladder at each support with 2 hold-down clamps UL KS and 2 M1030/V4A bolts.

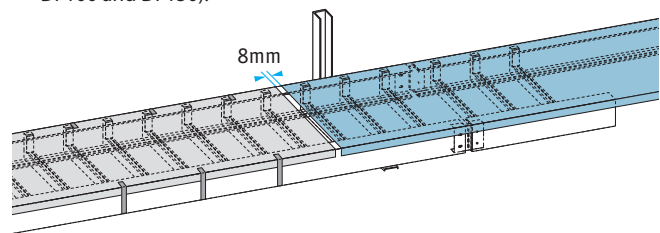


**4** Follow the installation procedure.



- A All fittings must be supported at every cable entry.
- B Add a central support for all fittings with radius greater than 250mm and/or with width greater than 400mm.
- C Lock systematically each splice plate UL IH with 4 M620/V4AS bolts on fittings extremities.

**5** Fix the cover with clips made of stainless steel 316 (ref.DF50, DF80, DF100 and DF150).



Under normal conditions use 3 clips alternatively on each side per 3 metres of ladders.

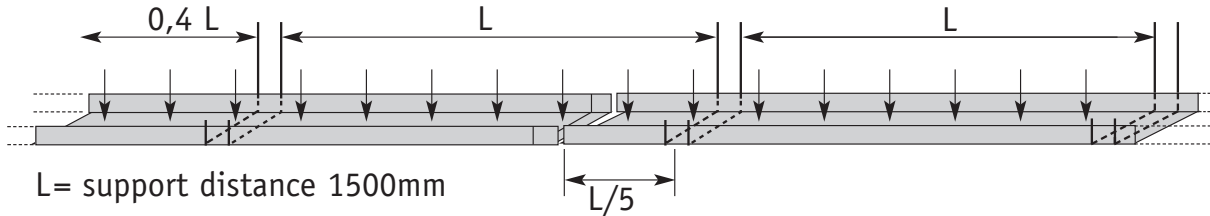
Under extreme conditions (strong winds > 60km/h) use 7 clips per 3 metres of ladders.

### GRP ladder and tray - continued

#### Standard span pressed tray

##### Load characteristics

Coefficient of safety > 1.7 (in accordance with IEC 61537) this data is given for ladders coupled with splice plates and bolts.

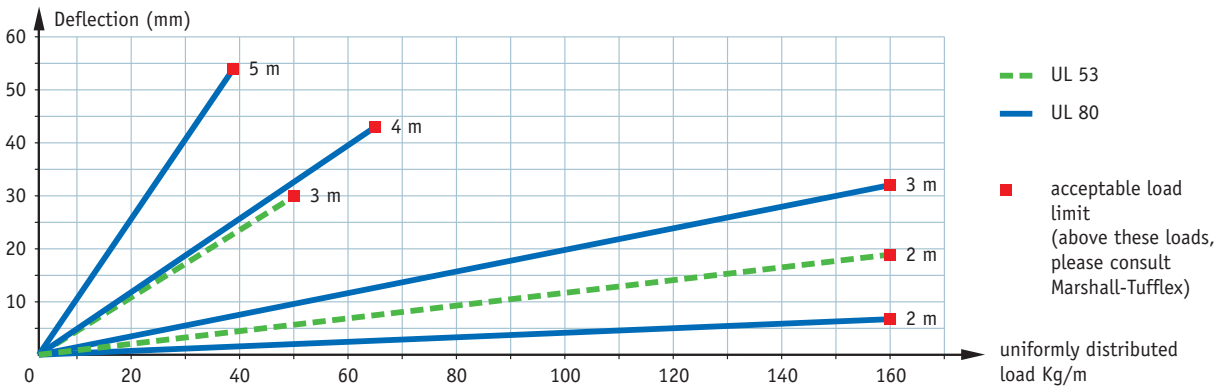


The deflection values are measured with the position of the junction between 2 ladders at a distance L/5 from a support. If this distance is not respected, it is necessary to raise the deflection values by about 30% when fully loaded.

	Useful area (mm <sup>2</sup> )	Weight of cables kg/m	Maximum admissible load kg/m according to the distance between supports				
			2m	3m	4m	5m	6m
UL...53	150 – 300	4420 – 9520 = 250	160	50			
	400 – 600	12920 – 19720 = 550		50			
UL...80	150 – 300	7690 – 16840 = 450	160	160	60	30	
	400 – 600	22940 – 35140 = 1000			60	30	

  Optimal conditions, for cost reduction on your installation.

Series UL load diagram: supporting distances from 2 to 5m.  
For 100mm and 150mm wall height refer to Marshall-Tufflex.



#### Localised loads

To be able to compare this to a uniformly distributed load it is necessary to double the value of the localised load. Example: A 60kg local load at the centre of a ladder with 3m of support distance. Equivalent load: 60 x 2 = 120kg uniformly distributed along 3m (ie 40kg/m).

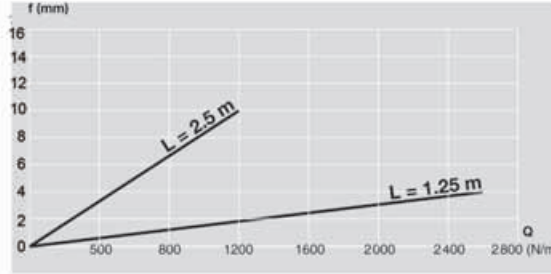
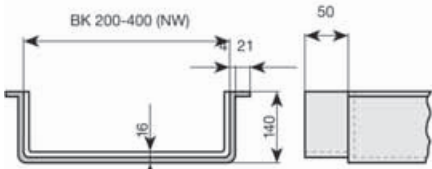
GRP ladder and tray - continued

GRP Ground Ducts

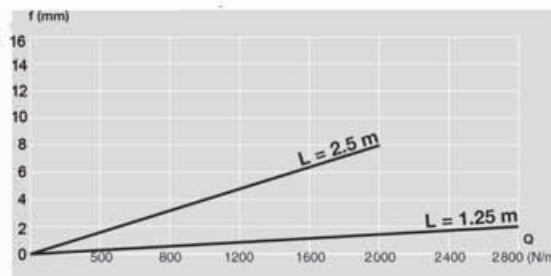
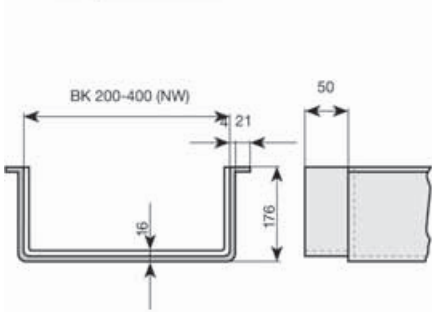
Load characteristics of ground duct

BK Height 140 mm

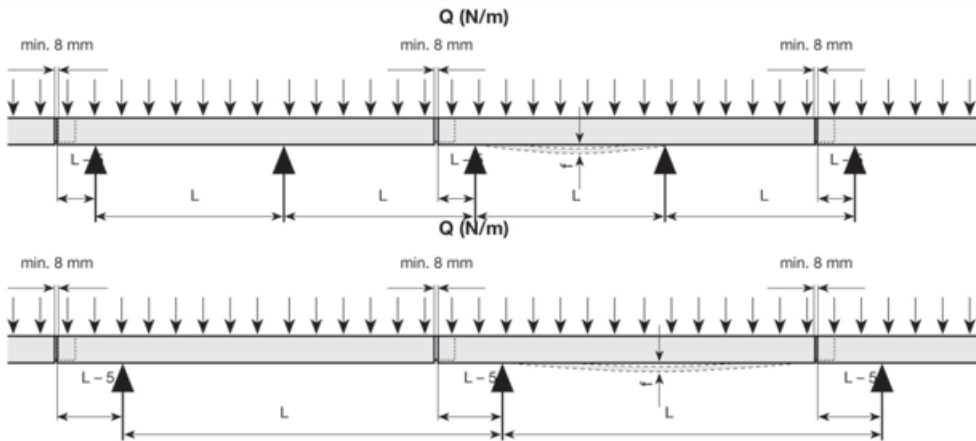
F = Deflection  
L = Support Distance  
Q = Distributed Load



BK Height 176 mm

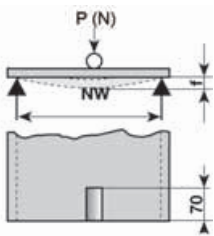


Tested in normal conditions of use



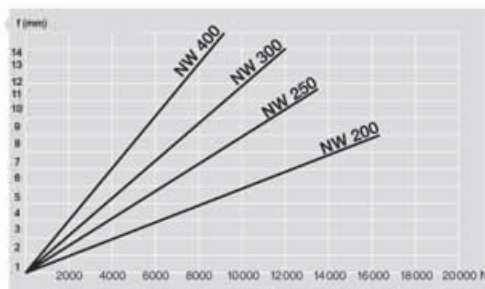
Load diagrams of plate covers

P = Load in N  
f = Deflection  
NW = Nominal width BK

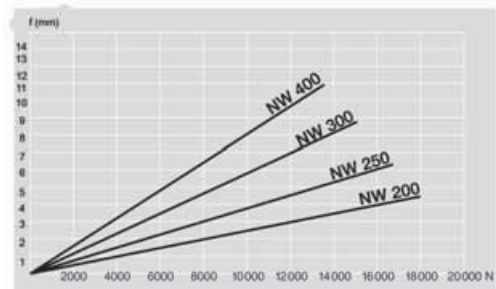


Load at edge of piece

BKDR 5mm



BKDR 8mm

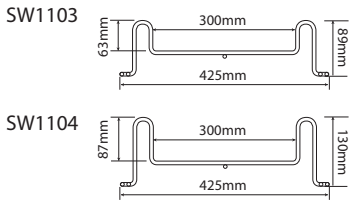


### SnakeWay

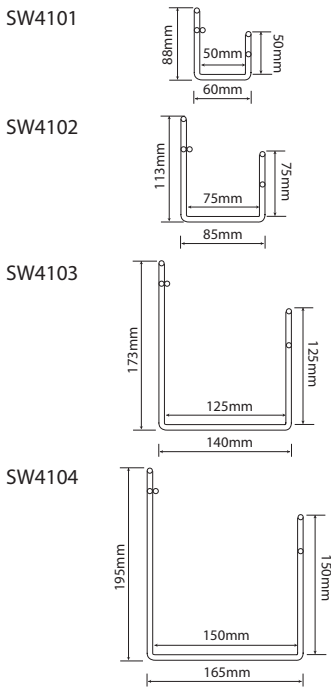
#### Material

SnakeWay is manufactured from ATM A510 high strength steel wire and pregalvanised in accordance with ASTM A641-89 to produce a resilient finish which is suitable for indoor application or mild and sheltered outdoor environments.

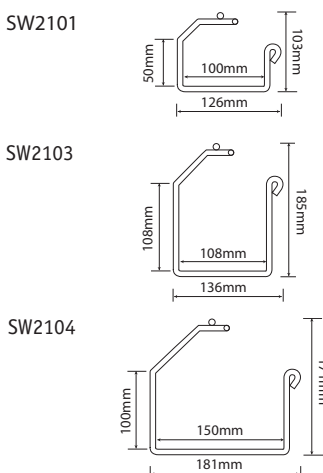
#### Floor SnakeWay



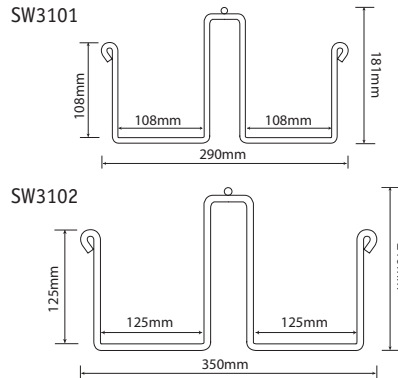
#### Wall SnakeWay



#### Hanging SnakeWay - single



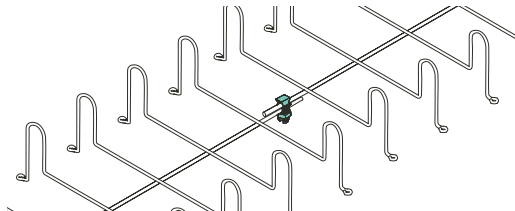
#### Hanging SnakeWay - double



**Note:** Use alternate mounting rings and support at the appropriate distance to accommodate the total cable capacity. Clamp each side of the mounting ring with a nut and washer. This will assist in maintaining a level profile when unbalanced loads are contained.

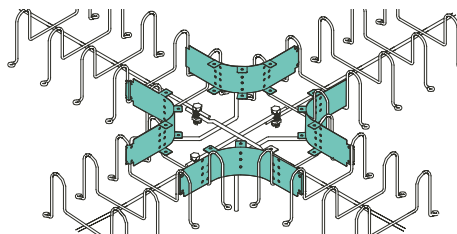
#### SnakeWay connector - SW1201

Provides both a mechanical and electrical connection when joining snakeway sections to one another. Only one required per connection.



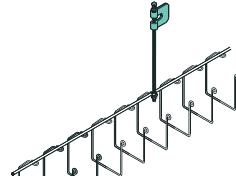
#### Floor intersection or tee

Used when creating 101 Series snakeway horizontal intersections. Creates a consistent smooth transition. Will not allow cables to kink. Easily attaches to SnakeWay with cable ties.



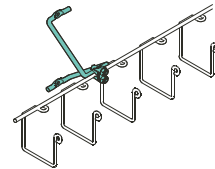
#### Beam clamp – SW2202

Attaches Hanging SnakeWay directly to the building structure or when suspending the snakeway with threaded rod. Clamp the mounting ring with a nut and washer on each side. The beam clamp will receive a 10mm threaded rod.



#### Wall bracket – SW2232

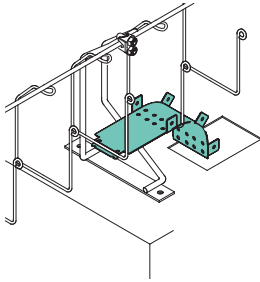
Used to attach single hanging SnakeWay to walls and other vertical surfaces.



**SnakeWay - continued**

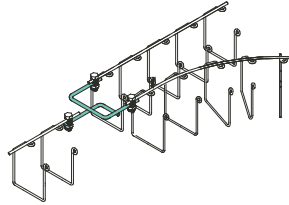
**Cable drop – SW2211 or SW2212**

Provides a smooth transition for cables when exiting the SnakeWay. Maintains a consistent 100mm radius eliminating kinked cables. Easily attaches to SnakeWay with cable ties.



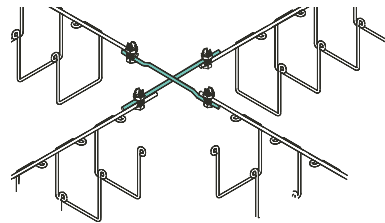
**Hanging Y connection – SW2222**

Used to create a 'Y' intersection or split double hanging into two separate cable paths at a terminal end.



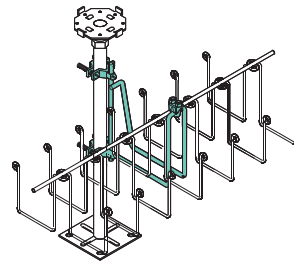
**Single hanging intersection – SW2221**

Installed as either a tee or four way crossing intersection.



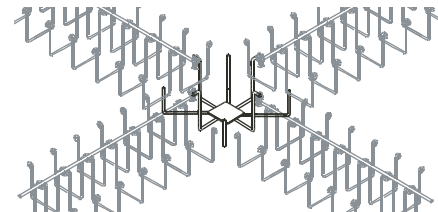
**Pedestal bracket – SW2234/SW3234**

Used to attach hanging SnakeWay to the floor pedestals utilised in the construction of raised access floor.



**Double hanging intersection – SW3221**

Installed as either a tee or four way crossing intersection component for the double hanging SnakeWay.



**Loading capacity data**

Product Code	Cable Capacity						Max. Load
	Space Factor sq mm	Twin & Earth 2.5mm/45% fill	Twin & Earth 4.0mm/45% fill	Typical 4 Core 35mm <sup>2</sup> SWA	Cat.5e UTP 5.5mm/45% Fill	Cat.6 UTP 6.5mm/45% Fill	U.D.L in Kg/m
SW1103	18900	155	122	8	282	202	Not Applicable
SW1104	26100	214	168	11	389	278	Not Applicable
SW2101	5000	41	32	2	75	53	5.3 span 1.2m
SW2102	5625	46	36	3	84	60	5.3 span 1.2m
SW2103	11664	95	75	4	174	124	5.3 span 1.2m
SW2104	15000	123	96	6	224	160	5.3 span 1.2m
SW3101	23328	191	150	4 x 2	348	249	5.3 span 1.2m
SW3102	31250	256	201	6 x 2	466	333	11.0 span 1.2m
SW4101	2500	20	16	1	37	27	5.3 span 1.2m
SW4102	5625	46	36	2	84	60	5.3 span 1.2m
SW4103	15625	128	100	6	233	167	5.3 span 1.2m
SW4104	22500	184	145	6	335	240	5.3 span 1.2m

Loading to give a 1% deflection with support adjacent to connector. Additional fastenings may be required to accommodate cable capacities shown.